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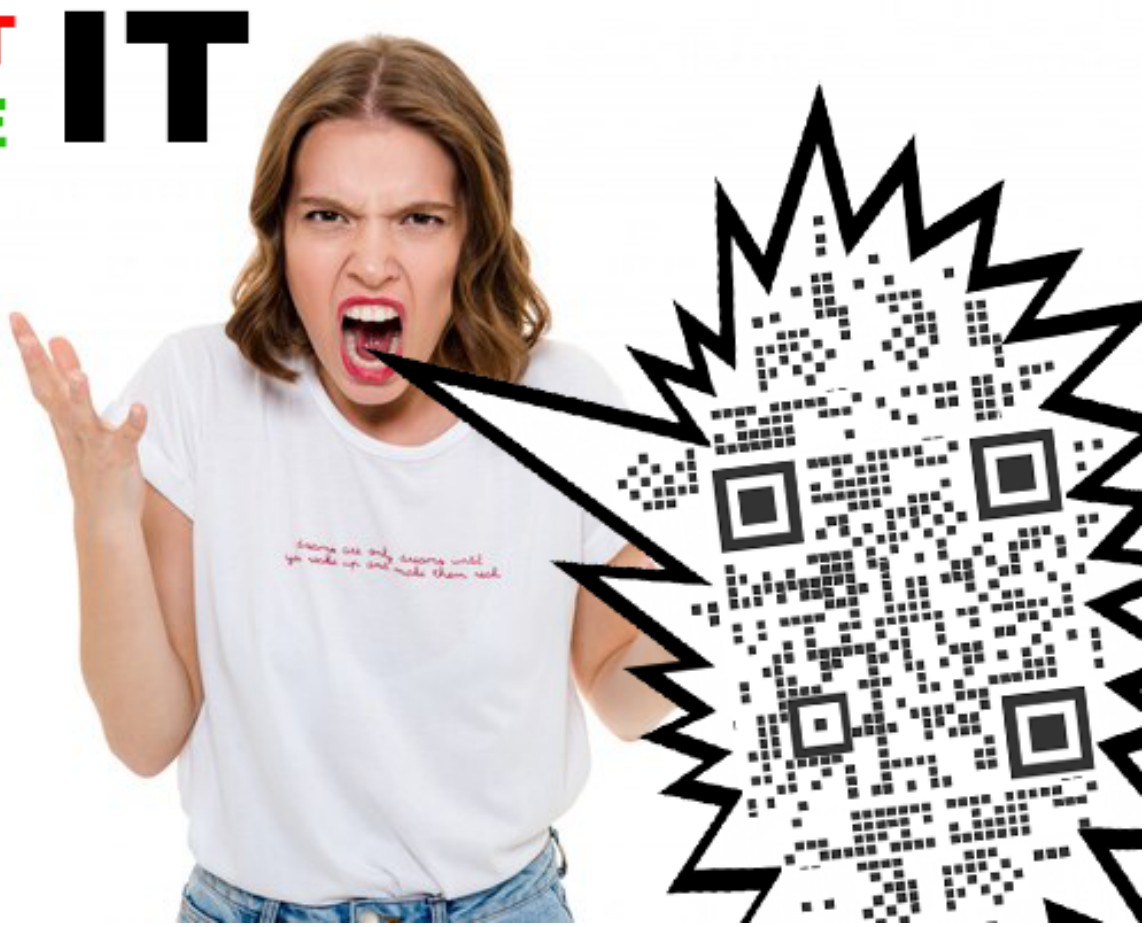

BULLETIN OF THE
U.S. DEPARTMENT OF AGRICULTURE

No. 187

Contribution from the Bureau of Biological Survey, Henry W. Henshaw, Chief.
February 11, 1915.

PRELIMINARY CENSUS OF BIRDS OF THE UNITED STATES.

By Wells W. Cooke, *Assistant Biologist.*

INTRODUCTION.

During the summer of 1914 the Biological Survey took initial steps toward a census of the birds of the United States for the purpose of ascertaining approximately the number and relative abundance of the different species. In view of the recognized value of birds to agriculture, such information can not fail to be of great value.

An added reason for this census was that the Congress has recently placed the Department of Agriculture in charge of migratory game and insectivorous birds, so that it is necessary that exact information be secured in regard to their present numbers as a basis for determining the adequacy of the present laws for their protection and whether the several species are increasing or diminishing.

The census will need to be repeated for several years and on a much larger scale before a satisfactory basis can be obtained for safe generalizations. It is hoped that all who can aid in the work will notify the Biological Survey in order that later necessary instructions and report blanks may be furnished. It will be understood that the bureau has no funds to pay for this work, and it must therefore depend upon volunteer observers. Bird observers in the West and the South are particularly requested to cooperate, as these sections have not been sufficiently covered in past observations. The circular of instructions for 1915 will be sent out early enough in the spring to allow ample time for making well-considered plans.

Note.—This bulletin is a preliminary report on the number and relative abundance of wild birds. It is for the information of those interested in the protection and increase of birds.

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PREVIOUS BIRD CENSUSES.

The first publication of the results of a bird census on a large scale in the United States was in 1901, at Berwyn, Pa., where F. L. Burns reported 588 pairs of native birds breeding on 640 acres.[1] This is in very close agreement with the 583 pairs found to be the average for the present census under comparable conditions. There was no such agreement, however, in regard to the English sparrow, Mr. Burns finding 106 pairs to the square mile as compared with about 60 pairs as the average for the 1914 census.

In the summer of 1907 the University of Illinois conducted a series of statistical bird studies,[2] and during the month of June found 600 native birds per square mile as the average for southern Illinois, or less than half the number found to be the average in the national census. The method of conducting the Illinois census, however, was so radically different from that used by the Biological Survey that the two sets of figures are scarcely comparable. The Illinois census finds for the whole State 114 English sparrows to the square mile as compared with about 120 sparrows per square mile for the national census; but here, again, the differences are really greater than the above figures would indicate, for in the Illinois census a large number of the English sparrows counted were young birds.

The differences between these three censuses are most noticeable in the case of the English sparrow. For every 100 native birds enumerated in the bureau's census of typical farms of northeastern United States, seven English sparrows were found. The Berwyn census and the Illinois census showed 18 English sparrows per 100 native birds, but, as already stated, many of these in the latter census were young birds.

PLANS FOR THE 1914 CENSUS.

The first season's work must necessarily be regarded as largely preliminary, and the present publication, which may be considered in the nature of a report of progress, is issued for the double purpose of giving information as to the actual accomplishment in the preliminary survey and of increasing public interest in the matter so that next season the work may be greatly extended.

A bird census of a tract of land near Washington, D. C., had been taken for several years and the experience thus gained was used as a basis for the following circular of instructions:

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[1] Burns, F. L. A Sectional Bird Census Taken at Berwyn, Chester County, Pa., During the Seasons of 1899, 1900, and 1901. Wilson Bulletin, No. 37, 1901, pp. 84–103.

[2] Forbes, S. A. The Mid-summer Bird Life of Illinois: A Statistical Study. American Naturalist, XLII, 1908, pp. 505–519.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF BIOLOGICAL SURVEY,
Washington, D. C., April 25, 1914.

DEAR SIR: The passage of the Federal law placing migratory game and insectivorous birds in charge of the Department of Agriculture makes it desirable to obtain more detailed and definite information concerning the distribution of bird life in the United States, and for this data we must look mainly to voluntary observers. This bureau desires to obtain a series of bird censuses, beginning with this summer (1914), taken during the breeding season, with a view to ascertaining how many pairs of each species of birds breed within definite areas. Such censuses will serve as a basis for determining later whether the present State and Federal laws are effective and whether game and insectivorous species are increasing or diminishing in numbers. In this undertaking you can materially aid by taking a census of the birds breeding this summer on some area or areas selected to fairly represent the average character of the country in your immediate neighborhood. The ideal tract of land would be one that exactly represents the average conditions of the neighborhood in the proportions of woodland, plowed land, meadow, etc., contained in it. As this idea is practically unattainable, an area should be selected representing fairly average farm conditions, but without woodland. It should not be less than 40 acres—a quarter of a mile square—nor more than 80 acres, and should include the farm buildings, with the usual shade trees, orchards, etc., as well as fields of plowed land and of pasture or meadow.

The area should be selected not only with reference to the present summer's work, but should, if possible, be chosen so that the physical conditions will not be much changed for several years; if succeeding annual censuses show changes in the bird population, it will be known that they are not due to changed environment.

What is wanted is a census of the pairs of birds actually nesting within the selected area. Birds that visit the area for feeding purposes should not be counted, no matter how close their nests are to the boundary lines.

It is practically impossible to take this census on the scale of 40 to 80 acres in a single day. A plan which has been used with advantage for several years is to begin at daylight some morning the last of May or the first week in June and zigzag back and forth across the area, counting the male birds. Early in the morning at that season every male bird should be in full song and easily counted. After the migration and the birds are settled in their summer quarters each male can safely be taken to represent a breeding pair.

The census of one day should be checked and revised by several days of further work, in order to insure that each bird seen is actually nesting within the area and make certain that no species has been overlooked.

The height of the breeding season should be chosen for this work. In the latitude of Washington—latitude 39°—May 30 is about the proper date for the original census. In the latitude of Boston the work should not begin for a week later, while south of Washington an earlier date should be selected.

The final results of the census should be sent to this bureau about June 30 and should be accompanied by a statement of the exact boundaries of the selected area, defined so explicitly that it will be possible 25 years hence to have the census repeated. The name of the present owner of the land should be given, together with a careful description of its character, including a statement whether the area is dry upland or moist bottom land, the number of acres in each of the principal crops, or in permanent meadow, pasture, orchard, swamp, roads, etc., the kind of fencing used, and whether there is much or little brush along any fences, roads, or streams, or in the permanent pasture.

If there is an isolated piece of woodland conveniently near and comprising 10 to 20 acres we should like to have a separate census made of the birds nesting therein.

In which case the report, in addition to the size and exact boundaries of the wooded tract, should state the principal kinds of trees and whether there is much or little undergrowth.

Still a third census desired is that of some definite area—as 40 acres, for instance—forming part of a much larger tract of timber, either deciduous or evergreen. While the number of birds on such an area would be far less than on an equal area of mixed farm land, their correct enumeration will require considerably more care and time.

The above are three kinds of bird censuses considered desirable, and it is hoped that you will volunteer to take one or more of them this season. In this connection we shall be very glad to have a statement from you concerning any changes you may have noted in the bird life of your locality, especially if your observations extend over a considerable number of years.

Should you desire further information in regard to the matter, we shall be glad to furnish it at any time.

Yours, very truly, H. W. Henshaw,
Chief Biological Survey.

Since no funds were available for this work, the above circular was sent to some 250 of the voluntary migration observers of the bureau, and a call was issued through the general press for volunteer census takers. There was a generous response and nearly 200 reports resulted. Some of the censuses were not properly taken owing to a misunderstanding of instructions and a few were incomplete from lack of acquaintance with some of the less common birds. However, there remains a sufficient number of satisfactory enumerations to serve as a basis for a few interesting deductions and to indicate the points which need to be more fully covered in future work.

RESULTS IN THE NORTHEASTERN STATES.

The larger number of censuses in 1914 were taken in the northeastern quarter of the United States, as shown by the map (fig. 1). Although 44 States are represented, less than a dozen reports came from the South Atlantic and Gulf States, and the number is no larger from the States west of the Rocky Mountains; while the reports from the Plains States—North Dakota to Oklahoma—are too few to be used as representing average conditions in this region. These three divisions, the South, the West, and the Plains, are so diversified in climatic and agricultural conditions and vary so widely in their bird life that many more bird censuses must be available before generalizations can be made for the whole country and reliable conclusions drawn.

The present report of progress concerns itself, therefore, with the census of birds on farms in northeastern United States, by which is meant the part north of North Carolina and east of Kansas. As the principal object of the proposed bird census was to ascertain the kind and number of birds on the farms of the United States, and as several of the most complete censuses were made on land which was not being

farmed or on which the conditions were evidently far different from the average farm, these censuses have not been used in computing the following averages, which are based on the enumerations apparently representing average farm conditions.

The average farm in the Northeastern States, according to the 1910 census, contains 108 acres, while the average area in the selected censuses is 58 acres, i. e., the census area consisted on the average of the farm buildings and the ground surrounding them together with approximately one-half of the land of the farm, leaving an average of 50 acres of land farthest from the buildings not covered by the census. Thus two problems are presented: First, how do the 58 acres

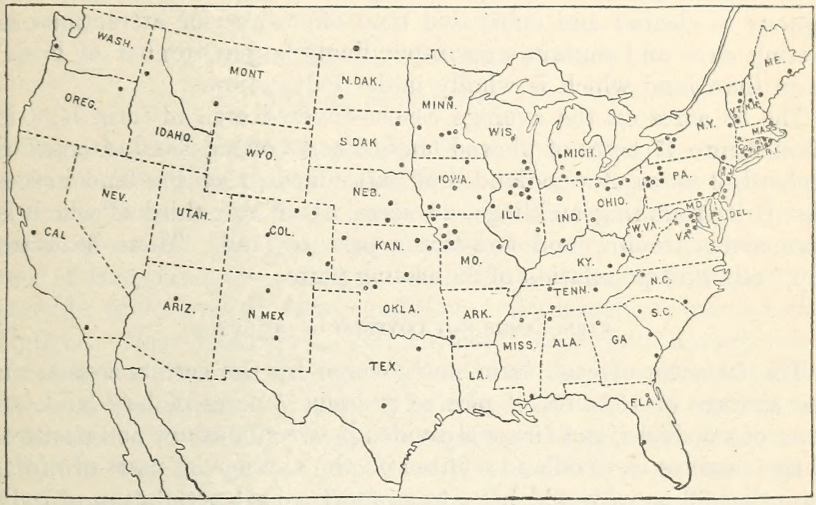

FIG. 1.—Places from which bird census reports were received in 1914.

covered by the census compare with the average farm; and second, how do the remaining 50 acres compare in bird population with the 58 acres chosen.

CENSUS-COVERED FARM LANDS.

That portion of the average farm covered by the census contained 30 per cent of plowed ground and 14 per cent of hay land, which, according to the 1910 census, is exactly the average percentage for the farms in this section of the United States. There is, however, a great difference in the relative size of the orchards; these farms contained 7.4 per cent of orchard, whereas the average for the northeastern quarter of the United States is only 1.2 per cent, or, in other words, the areas selected for the bird census contain six times as many acres of orchard as the average. Each area also contains the farm buildings with accompanying shade trees, ornamental shrubs, small fruits, and vegetable garden, forming the most favorable nesting sites on the

farm and affording the largest amount of food per acre. There is no doubt that the average 5 acres immediately surrounding farm buildings contain more birds' nests than any other 5 acres on a farm. As the farms selected contained orchards larger than the average, and as orchards are especially preferred by many kinds of birds for nesting sites, the areas selected evidently have a bird population denser than that of farm lands as a whole.

The letter of instructions asked specifically that censuses of woodland be made separately from the rest of the farm land, and many such censuses were received the average of which was 175 pairs to each 100 acres, while the farm land contained 119 pairs per 100 acres. It is evident, then, that comparatively small areas of woodland contiguous to cleared and cultivated land offer superior attractions as nesting sites and contain a correspondingly larger number of birds' nests than land which is wholly under cultivation.

The 58 acres on the average census-covered area of farm land is divided into 17 acres of plowed land, 8 acres of hay land, 4 acres of orchard, 3 acres of woodland, and, after deducting the land immediately surrounding buildings, 26 acres, about one-third of which is permanent meadow and two-thirds pasture land. These 58 acres support a bird population of 69 nesting pairs.

FARM LANDS NOT COVERED BY CENSUS.

The 50 acres of each farm not covered by the census consist on the average of 15 acres of plowed ground, 7 acres of hay land, 18 acres of woodland, and 10 acres divided between meadow and pasture. If the 18 acres of woodland contain on the average 31 pairs of birds, the other 32 acres would have to support a bird population of only 28 pairs to give these 50 acres the same bird population per acre as the part where the buildings are situated. It is not probable that the 32 acres would have quite 28 pairs, but they may easily have half that number, or a total of 114 pairs on 108 acres, practically one pair to the acre for the land in farms in the Northeastern States.

NONFARMED LANDS.

There remains the question of the bird population on the areas not included under the head of farm land. Again reverting to the returns of the census of 1910, in the great farming States of Iowa and Ohio this land represents less than 10 per cent of the whole area, almost a negligible quantity, while for New England it is just half the total area, and there is nearly as large a proportion in Wisconsin and Minnesota.

This nonfarmed land is largely forest, and unfortunately not a single bird census has been contributed from an area typical of forest conditions in the Northeastern States. The only census on a large

scale received of a true forest comes from near Coeur d'Alene, Idaho, and this shows 254 pairs of breeding birds on 768 acres, or one pair to 3 acres. The heavy timber of New England, of the mountains of Pennsylvania, of northern Michigan, and of northern Wisconsin would certainly contain a bird population no more numerous than that shown in Idaho, for it is well known that the heavy forest of the eastern mountains is a region of silence.

On the other hand, whatever land of the nonfarmed area is not covered by forest, whether it is marsh or rocky hillside, is fairly well supplied with birds and probably averages nearly as high in its avian population as the farm land. An estimate, therefore, of one pair of birds for each 2 acres on such nonfarmed land would be fairly accurate.

DEDUCTIONS FROM THE CENSUS.

NUMBER OF BIRDS TOO FEW.

That the present bird population is much less than it ought to be and much less than it would be if birds were given proper protection and encouragement is the most important deduction from this preliminary census. An approximate average of one pair of birds to each acre of farm land was found, but individual censuses show that it is possible, under strictly farm conditions, very largely to increase this number. Near Wellington, Va., a tract of 49 acres of a dairy farm, of rather less than the average of plowed land, supported a bird population of 137 pairs, or 3 pairs to the acre. The 15 acres surrounding a farmhouse at Port Byron, Ill., though more than half under cultivation, was found to contain 50 pairs of birds—a little more than 3 pairs to the acre. An 80-acre tract at La Grange, Ill., is described as "mostly dry upland; about 25 acres are covered with crops; very little pasture, one small orchard, two small swamps; no roads going through it, and in fact, this area is typical of the vicinity of La Grange;" yet this area showed 219 pairs of birds, or nearly three times as many as the average for the State. A similar area at Albany, Mo., "selected because it is ideal for the census, containing all the required conditions," was divided into 14 acres of plowed land, 27 acres of hayfields, a brushy pasture, with a little heavy timber along the banks of a small stream, and the customary farmyard, orchard, garden, etc. The conditions for bird life were probably more favorable than the average, but not sufficiently different to account for the 298 pairs of birds nesting on the tract. A 40-acre farm at Rantoul, Kans., has 30 acres in clover and alfalfa, but the owner says that one strictly enforced rule on this ranch is protection for the birds, and that trees have been planted and groves arranged especially for nesting sites. The remaining 10 acres contain the buildings, 2 acres of orchard, 3 acres of groves, and a 2-acre artificial pond that never goes dry. The

consequence is that after 14 years of bird protection and encouragement, these 40 acres support 157 pairs of birds, or about 4 pairs to the acre.

POSSIBLE TO INCREASE NUMBER OF BIRDS.

It is evident from the foregoing statement that double the present bird population is easily obtainable, while a threefold increase is well within the possibilities.

The maximum census just cited of 4 pairs of birds to the acre does not by any means represent the largest number of birds that can be supported on a given area. In the summer of 1914, the 40 acres comprising the southern end of the National Zoological Park, at Washington, D. C., harbored 164 pairs of birds of 50 species—a notably large variety and a numerous population. Two blocks on the outskirts of Kenilworth, Ill., containing 15 acres, were reported to contain 84 pairs of birds. A section of five blocks at Chevy Chase, Md., covering 23 acres, showed a bird population of 148 pairs—nearly 7 pairs per acre. As this is the highest score reached in the census this tract will be treated more fully farther on in this bulletin.

But bird life can become even more abundant under proper conditions. On a 50-acre tract at Viresco, Va., where the birds have been strictly protected during the last seven years, exact censuses show a 50 per cent increase in the birds during the past four years. On the 3 acres containing the house, 15 pairs nested during 1914. On 1½ acres about a city home at Cranston, R. I., 8 pairs of birds nested in 1914 where 12 pairs had nested in 1910, and the owner claims that cats are mainly responsible for the decrease. A field of 2 acres at Nevada, Iowa, on which was growing a variety of tree and bush fruits, as well as hardwoods, evergreens, and shrubbery, had been found and appreciated by the birds, as evidenced by 22 pairs nesting there. At Kenilworth, Ill., in the midst of the 15-acre tract previously referred to, stands a house whose owner "believes in befriending the wild birds—our friends and neighbors," and as a consequence, in 1914 his yard of half an acre had 9 pairs of birds.

RECORD FOR DENSITY OF POPULATION.

The census at Chevy Chase, Md., showed the highest number of birds per acre of all the censuses so far reported to the Biological Survey. Here the owner of a half-acre yard, which was well supplied with trees and shrubbery, had put up nesting boxes and provided a bird bath, and was rewarded with a nesting population of 13 pairs of birds.

The census area consisted of about five blocks, selected from the most populous part of the village. These ranged from 3 to 6 acres in size and were all occupied by houses, from 5 to 10 houses to

the block. Each house was surrounded by a yard of from half an acre to 1½ acres, the whole being abundantly supplied with large trees of oak and other hardwoods. Most of the houses in this section had been built within the last 10 years, but the area previous to that time was covered with heavy timber and as many as possible of the large trees had been preserved. In addition, an abundance of smaller trees and ornamental shrubs occupied a large proportion of the ground and there was almost a minimum of lawn for houses situated with such extensive grounds. The whole area is a residential section, containing no public buildings and occupied by a cultured class of people, many of whom have become interested in the subject of bird protection, with the result that numerous bird boxes have been put up and also a number of bird lunch counters for winter feeding. Practically all enemies of birds have been eliminated except the domestic cat, and its numbers here are below the average for such communities.

The result of all these conditions is that the village swarms with birds. When attempting to take a bird census in the early morning by counting the singing males, the chorus was so numerous at times that it was impossible to distinguish the individual songsters. The census showed 34 different species nesting on the 23 acres, with a total of 148 pairs of native breeding birds and 13 pairs of English sparrows. The most numerous species was the robin, 19 pairs; and following this came the catbird, 18 pairs; the purple grackle, 17; the house wren, 16; and red-eyed vireo, 10 pairs. Robins and catbirds were easily the most conspicuous species and their numbers alone were 50 per cent higher than the total normal bird population of this area. The presence of a very large number of cherry trees in each of the blocks—many of these trees being 30 to 40 feet high—as well as an abundance of bush fruits, may account for their specially large numbers. Almost all the cherries on these higher trees were left for the use of the birds.

It was noticeable that the blocks most thickly inhabited by people were also most fully occupied by breeding birds. This is a striking refutation of the widespread belief that human beings and birds are naturally antagonistic, and that as the population of the United States increases the number of the birds must necessarily decrease.

RELATIVE ABUNDANCE OF BIRDS.

One of the most abundant birds in the United States, possibly the most abundant bird, is the robin. It is also one of the most sociable, and in the northeastern part, where it is most abundant, it commonly nests close to farm buildings but almost never in extensive woods. Its numbers are exceedingly variable in the localities represented by

the bird censuses. All but three of the observers report its presence on the census-covered areas, while its numbers vary from one pair on a 49-acre tract in Virginia, and one pair on a 79-acre farm in western Pennsylvania, to 11 pairs on 80 acres in Vermont, 12 pairs on 100 acres in Maine, and 16 pairs on 70 acres in Connecticut. The densest robin population reported was 21 pairs on 40 acres at Meriden, Conn., and 19 pairs on 23 acres at Chevy Chase, Md., but in both cases the areas selected were village lots with no cultivated land and a maximum of attractive building sites in shade and fruit trees. The average of the censuses of robins on farms in northeastern United States is six pairs per farm on the 58 acres.

The next most common bird in the Northeastern States is the English sparrow. Ordinarily this bird is thought of as a city rather than as a country bird, for nowhere on farms can the flocks of hundreds be found which are a common sight during winter in the larger cities. However, nearly every farm has a few pairs and the number of farms is so great that the aggregate farm population is probably several times that in the cities. The census of farms in the Northeastern States averages five pairs of English sparrows to each farm.

No other bird is anywhere near as abundant as either the robin or the English sparrow, but several others are common enough to make their total numbers run well into the millions. For every 100 robins reported in the 1914 census there were 49 catbirds, 37 brown thrashers, 28 house wrens, 27 kingbirds, and 26 bluebirds. This last number is particularly gratifying because only a few years ago nearly the whole bluebird population of the Eastern States was destroyed by an unusually severe winter. Since then the birds have been gradually recovering from the catastrophe, and this season's census shows that there are now several million bluebirds in northeastern United States.

SUMMARY.

The census of birds of the United States was undertaken to ascertain the number and relative abundance of species as a basis for determining the adequacy of the protection now afforded them, in view of the law protecting migratory game and insectivorous birds.

While previous attempts were more local and not on the scale deemed necessary in the plans for the 1914 census, this census did not yield needful information from all parts of the country, the fullest reports coming from the Northeastern States.

The census will need to be repeated on a larger scale for several years and, for comparative purposes, should more fully cover the Southern and Western States, that the cause of increase or decrease in numbers may be determined, and that it may be known whether the changes are general or local.

The census covered 58 of the 108 acres of the average farm of the Northeastern States and revealed on this area a bird population of 69 nesting pairs, and on the remaining 50 acres it is estimated that there would be about one pair to the acre; in all, 114 nesting pairs to the 108 acres of farmed land. On the 46 acres of wild land existing for each 108 acres of farmed land it is safe to assume that there would be fewer birds than on the census-covered area.

The results of the census show that the numbers of birds are too few, and it is believed that with adequate protection and encouragement they can be materially increased. The record for density comes from Chevy Chase, Md., where 161 pairs of 34 species were found nesting on 23 acres.

This preliminary census shows that the most abundant bird on farms of the Northeastern States is the robin; that the next is the English sparrow; and that following these are the catbird, the brown thrasher, the house wren, the kingbird, and the bluebird in the order named.

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